APPENDIX 10-C

# Stormwater Sampling Documentation

APPENDIX 10-C(1)

# Stormwater Sampling Work Plan

**Hydrometrics, Inc.®**
**consulting scientists and engineers**

# M E M O R A N D U M

DATE: May 28, 2010

TO: Cindy Brooks, Montana Environmental Trust Group

FROM: Mark Rhodes, Bob Anderson

SUBJECT: Proposed Scope of Work and Budget for Evaluation of Storm Water Runoff Conditions and Discharge Options at the East Helena Facility

This memorandum presents a brief Scope of Work and preliminary budget for evaluation of storm water runoff at the East Helena Facility. As you are aware, the majority of the former plant site is currently covered with concrete, asphalt or temporary synthetic liners. As a result, infiltration capacity across the site is relatively low, and storm water runoff relatively high. The majority of site runoff is diverted to the rodeo grounds storage tank (or other on site storage facilities), and then to the HDS water treatment plant for treatment and disposal under the facility MPDES permit. Based on the extensive cleanup activities conducted over the past few years, namely the demolition of several structures and placement of temporary covers over the former structure footprints, current storm water characteristics at the site are not well defined. Based on the current site surface conditions, it is possible that a significant portion of the site runoff may be suitable for direct discharge under the facility storm water permit without treatment at the HDS plant.

Following is a proposed scope of work to assess current storm water runoff conditions at the site, in terms of runoff quantity, quality and drainage patterns, and to assess options for reducing the volume of water requiring treatment at the HDS plant. The ultimate goal of this project would be to reduce overall water treatment and O&M requirements and costs for the East Helena facility. The project is divided into four tasks as described below. A preliminary budget is included as Attachment 1.

## Task 1: Characterization of Storm Water Runoff

The first step in the process is to quantify storm water runoff patterns, rates and quality across the plant site. Attached Figure 1 shows storm water drainage areas across the site as depicted in the 2006 facility SWPPP. The runoff patterns and rates will be documented during two storm water runoff events during spring 2010. Water samples will also be collected twice during spring 2010 to document runoff water quality from different portions of the site. Runoff samples will be collected at the outfall of all major drainage areas shown on Figure 1, and from sub areas within these drainage areas. Based on the runoff mapping and sampling

results, a determination will be made regarding the runoff water quality from various portions of the site, including identification of potential storm water contaminant source areas.

The first sampling event was conducted on May 24th when 17 water samples were collected. The sampling locations are shown on Figure 1 and listed in Table 1. A photolog of the sampling event is included in Attachment 2. Of the 17 samples collected, eight have been submitted to Energy Laboratories for analysis of TSS, pH and total recoverable arsenic, selenium, cadmium, copper, iron, lead and zinc. The eight samples represent main sumps or storm water collections points, with the remaining samples representing drainage to these main points. Pending analytical results from the main collection points, additional samples from 5/24 can be submitted for analyses to better delineate contaminant source areas for any collection points exhibiting elevated metals or TSS concentrations.

**Task 2: Identify Contaminant Source Areas and Remedial Options:**

Based on results of Task 1, and review of relevant available soils and water quality data, potential storm water contaminant source areas will be identified. Currently suspected source areas include, but are not limited to, the former onsite rail corridors and the lower ore storage area where soils are exposed. Following the source area delineation, remedial options will be evaluated and screened for effectiveness, cost and implementability. Potential remedies may include: segregation of clean and dirty runoff waters through ditching or piping; removal of contaminated surface soils, or regrading/capping of contaminated areas to prevent contact with runoff water. Capping could include placement of temporary synthetic liners, placement of soil cap, or application of soil tackifier material to reduce infiltration and erosion. It may include placement of "final" RCRA-type or evapotranspiration caps for source areas under a corrective measures study of final site cap options.

**Task 3: Design of Remedial Measures**

Based on the results of Task 1 and 2, design plans will be prepared for remedial actions to be taken. Design plans will include all required grading plans, cap designs, drainage features, and site revegetation or soil conditioning details. Task 3 will also address modifications requirements for the site storm water and MPDES permits to allow for direct discharge of storm water without HDS treatment, and requirements for placing any excavated soils or other contaminated materials into the Phase II CAMU cell.

**Task 4: Remedial Plan Implementation**

Task 4 will include implementation of the remedial design plans prepared under Task 3. Although details of any remedial plans have yet to be determined, Attachment 1 includes an estimated budget for one potential remedial scenario. The Task 4 budget is intended to provide information necessary to perform a simple cost/benefit analysis of any potential storm water runoff improvement plans as compared to the current water treatment/site O&M program.

We have intentionally kept this memo brief Cindy to provide you a summary of the proposed storm water assessment activities. We look forward to discussing this in more detail at your convenience.

APPENDIX 10-C(2)

# Stormwater Sampling Notes

16 Location ASARCO EH Stormwater sampling Date 5/24/10

Project / Client

M. Rhodes, G. Lorenzen

| Site Name | DATE | Time | Sample ID | pH/SC |
|---|---|---|---|---|
| Culvert under old Hopto bins | 5/24/10 | 11.00 | EHSW-1005-100 | 7.68/55 |
| Bayhouse Sump | | | | |
| Water Flow from sample mill direction | | 11:05 | EHSW-1005-101 | 8.07/40 |
| From Bayhouse Line | | 11:10 | EHSW-1005-102 | 7.45/6 |
| Sump water | | 11:15 | EHSW-1005-103 | 7.94/40 |
| Scalehouse sump | | 11:30 | EHSW-1005-104 | 7.24/43 |
| Ponded water by scalehouse + RR Tracks | | 11:35 | EHSW-1005-105 | 7.42/43 |
| Sinter Plant Sump | | 11:45 | EHSW-1005-106 | 6.53/25 |
| Sinter Plant Line | | 11:50 | EHSW-1005-107 | 6.15/5 |

Location Date 17

Project / Client

Flow


0.00942 cfs
4.23 gpm

5 gpm estimated

4 gpm estimated

6-inch dia pipe - depth 3 in

Flow into sump 1-2 gpm

1 gpm estimated sheet flow

1-3 gpm - sheet flow

0.5 gpm estimated

Location Asarco EH Storm water Date 5/24/10

Project / Client M. Rhodes, G. Lorenson

| Site Name | DATE | Time | Sample ID | pH/SC | |
|---|---|---|---|---|---|
| Ore storage Pad into channel | 5/24/10 | 12:00 | EHSW-1005-108 | 6.71/24 | 1 liter/min |
| NE corner most sump from ~~west~~ east side of ore dome | 5/24/10 | 12:10 | EHSW-1005-109 | 6.40/36 | 0.2 [est] flow in 15 inch pipe |
| Runoff from RR Tracks Ditch by Thawhouse | | 12:20 | EHSW-1005-110 | ~~147~~ 7.34/147 | 1 gpm |
| Thawhouse Gate Sump | | 12:25 | EH-1005-111 | 7.56/113 | 6-7 gpm |
| Ore storage Yard ~~fence~~ runoff | | 12:30 | EHSW-1005-112 | 7.62/97 | 5 gpm estimate |
| Ore storage Yard Ditch runoff | | 12:35 | EHSW-1005-113 | 9.35/623 | 0.5 liter/min |
| Ore storage Yard culvert combo of 112/113 | | 12:40 | EHSW-1005-114 | 8.25/118 | 5 gpm |
| SW Sump by Treatment Plant | | 12:50 | EHSW-1005-115 | 8.17/16 | 1-2 gpm off liners |

Location Date

Project / Client

20 Location Asarco EH Steamwater Date 5/24/10

Project / Client

M. Rhoder, G. Greiner

| | | | | | |
|---|---|---|---|---|---|
| Rodeo Tank | | 13:00 | EHSW-1005-116 | 808/95 | |

Location Date 21

Project / Client

**Water Sampling Form ~~ HF-430**

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** East Helena Long Term Mont.
**Project Code:** 10022
**Sample Team Member(s):** C Bryce
**Laboratory Used:** Energy Labs

**Site Designation:** PPC-8
**Sample Code Number:** AEH-1007-100
**Sample Date:** 7-8-10
**Sample Time:** 09:45 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: AEH-1007-
Duplicate Sample Time:

***Site Conditions***

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: (calm) breeze windy
(no precip) rain snow
(clear) p. cloudy overcast
Air Temperature: °C ≈65 °F

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia²) / 25 Comments
TD (ft):
SWL (ft): no access pumping
Casing Diameter (I.D.") :
Water Volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Pumping Rate (gpm):

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir (Estimate)
Other Flow or Description: Float Method
Width = 38' Dist: 31'
Depth = 1.6' Time: 5.57, 5.42, 5.34 Avg = 5.44
Flow: gpm 346 (cfs) Staff Gage: NA

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | PUMP ON | | | | | | |
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**Turbidity:** (circle) clear (slight) moderate very

**Sample Method:** (grab) composite pump bailer other
(describe)

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | 10.33 | |
| pH | 6.79 | |
| SC (µmhos/cm) | 169 | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | 11.61 | |
| Color | None | |
| Odor | None | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 500 ml | Unfiltered | Raw | common | |
| 1 | 250 ml | Unfiltered | $HNO_3$ | TRC Metals | |
| 1 | 250 ml | Filtered | HCL | Diss Al | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature:

**Water Sampling Form ~~ HF-430**

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** East Helena Longterm Mont. **Site Designation:** PPC-7
**Project Code:** 10022 **Sample Code Number:** AEH-1007- 101
**Sample Team Member(s):** C Boyce **Sample Date:** 7-8-10
**Laboratory Used:** Energy Labs **Sample Time:** 10:20 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: AEH-1007-
Duplicate Sample Time:

***Site Conditions***

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: (calm) breeze windy
(no precip.) rain snow
(clear) p. cloudy overcast
Air Temperature: °C 36.5 °F

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.²) / 25 Comments
TD (ft)
SWL (ft) no access/pumping
Casing Diameter (I.D.") x 3=(gal.)
Water Volume (V) (gal.)
Actual Vol. Removed (gal.)
Pumping Rate (gpm)

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description: Float Method
W 39.2 Dist 3.1'
Depth 2.3" Time ~~6.47~~ ~~6.46~~ ~~6.79~~ Avg: 6.78
6.94' 6.95' 6.47
Flow: gpm 412 (cfs) Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | PUMP ON | | | | | | |
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**Turbidity:** (circle) clear (slight) moderate very

**Sample Method:** (describe) (grab) composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | 9.91 | |
| pH | 7.20 | |
| SC (µmhos/cm) | 169 | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | 11.77 | |
| Color | None | |
| Odor | None | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 500 ml | Unfiltered | Raw | common | |
| 1 | 250 ml | Unfiltered | $HNO_3$ | TRC Metals | |
| 1 | 250 ml | Filtered | HCL | Diss Al | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Page of

**Water Sampling Form ~~ HF-430**

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** E. HLN Long-term Monitoring
**Project Code:** 10022
**Sample Team Member(s):** CBoyce
**Laboratory Used:** Energy Labs

**Site Designation:** PPC-5
**Sample Code Number:** AEH-1007- 102
**Sample Date:** 7-8-10
**Sample Time:** 11:00 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: AEH-1007-
Duplicate Sample Time:

***Site Conditions***

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: (calm) breeze windy
(no precip) rain snow
(clear) p. cloudy overcast
Air Temperature: °C 36.5 °F

***For Groundwater Samples***

| | |
|---|---|
| well volume formula: | V = (TD-SWL)x(Dia.²) / 25 |
| TD (ft): | |
| SWL (ft): | |
| Casing Diameter (I.D.") | |
| Water Volume (V) (gal) | |
| x 3=(gal.) | |
| Actual Vol. Removed (gal.) | |
| Pumping Rate (gpm) | |

Comments: no access/pumping

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description: N/A see comments
Flow: gpm cfs Staff Gage: 1.81

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | PUMP ON | | | | | | |
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**Turbidity:** (circle) (clear) slight moderate very

**Sample Method:** (describe) (grab) composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | | |
| pH | | |
| SC (µmhos/cm) | | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | | |
| Color | | |
| Odor | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 500 ml | Unfiltered | Raw | common | |
| 1 | 250 ml | Unfiltered | $HNO_3$ | TRC Metals | |
| 1 | 250 ml | Filtered | HCL | Diss Al | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Attempted Flow, but flout method would not work due to turbulent flow and willows causing flout to hang up

Sample Team Member Signature: CBoyce Page of

**Water Sampling Form ~~ HF-430**

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** E. Hln Longterm Plant.
**Project Code:** 10022
**Sample Team Member(s):** CBoyce
**Laboratory Used:** Energy Labs

**Site Designation:** PPC-103
**Sample Code Number:** AEH-1007-103
**Sample Date:** ~~7-15~~ 7-8-10
**Sample Time:** 10:15 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: AEH-1007-104
Duplicate Sample Time: 11:20

***Site Conditions***

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: (calm) breeze windy
no precip. rain snow
clear (p. cloudy) overcast
Air Temperature: °C ≈70 °F

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.")² / 25 Comments
TD (ft):
SWL (ft): no access to pumping
Casing Diameter (I.D."):
Water Volume (V) (gal):
x 3=(gal.):
Actual Vol. Removed (gal.):
Pumping Rate (gpm):

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description: N/A
Flow: gpm cfs Staff Gage: 1.78

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | PUMP ON | | | | | | |
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**Turbidity:** (circle) clear (slight) moderate very

**Sample Method:** (describe) (grab) composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | 9.81 | |
| pH | 7.64 | |
| SC (µmhos/cm) | 168 | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | 11.99 | |
| Color | Clear | |
| Odor | None | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 500 ml | Unfiltered | Raw | common | |
| 1 | 250 ml | Unfiltered | $HNO_3$ | TRC Metals | |
| 1 | 250 ml | Filtered | HCL | Diss Al | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: Unable to collect flow measurement. Flow very high and in two channels, No Access to one channel.

Sample Team Member Signature: [signature] Page of

**Water Sampling Form ~~ HF-430**

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** E. Hln Long-term Mont. **Site Designation:** Lower Lake
**Project Code:** 10027 **Sample Code Number:** AEH-1007-105
**Sample Team Member(s):** [illegible] **Sample Date:** 7-8-10
**Laboratory Used:** Energy Labs **Sample Time:** 11:35 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: AEH-1007-
Duplicate Sample Time:

***Site Conditions***

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: (calm) breeze windy
(no precip.) rain snow
(clear) p. cloudy overcast
Air Temperature: °C 21 70 °F

***For Groundwater Samples***

| | well volume formula: V = (TD-SWL)x(Dia.²) / 25 | Comments |
|---|---|---|
| TD (ft) | | |
| SWL (ft) | | no access-pumping |
| Casing Diameter (I.D.") | | |
| Water Volume (V) (gal) | | |
| x 3=(gal.) | | |
| Actual Vol. Removed (gal.) | | |
| Pumping Rate (gpm) | | |

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir (Estimate)
Other Flow or Description:
Flow: gpm cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | PUMP ON | | | | | | |
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**Turbidity:** (circle) clear slight moderate very

**Sample Method:** (describe) (grab) composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | 6.96 | |
| pH | 7.19 | |
| SC (µmhos/cm) | 512 | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | 14.75 | |
| Color | None | |
| Odor | Yes | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 500 ml | Unfiltered | Raw | common | |
| 1 | 250 ml | Unfiltered | $HNO_3$ | TRC Metals | |
| 1 | 250 ml | Filtered | HCL | Diss Al | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: [signature] Page of

**Water Sampling Form ~~ HF-430**

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** E. HLN Long-term Mont.
**Project Code:** 10022
**Sample Team Member(s):** CBayer
**Laboratory Used:** Energy Labs

**Site Designation:** PPC-3A
**Sample Code Number:** AEH-1007-106
**Sample Date:** 7-8-10
**Sample Time:** 12:15 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: AEH-1007-
Duplicate Sample Time:

***Site Conditions***

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: (calm) breeze windy
(no precip.) rain snow
(clear) p. cloudy overcast
Air Temperature: °C 37.5 °F

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.²) / 25
TD (ft)
SWL (ft):
Casing Diameter (I.D.") no access/pumping
Water volume (V) (gal):
x 3=(gal.)
Actual Vol. Removed (gal.)
Pumping Rate (gpm)
Comments

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
W Dist 27'
D Time 3.89, 3.85, 3.68
Flow: gpm N/A cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | PUMP ON | | | | | | |
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**Turbidity:** (circle) (clear) slight moderate very

**Sample Method:** (describe) (grab) composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | 11.21 | |
| pH | 7.05 | |
| SC (µmhos/cm) | 168 | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | ~~11.2~~ 12.0 | |
| Color | clear | |
| Odor | none | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 500 ml | Unfiltered | Raw | common | |
| 1 | 250 ml | Unfiltered | $HNO_3$ | TRC Metals | |
| 1 | 250 ml | Filtered | HCL | Diss Al | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: WL @ Marked site with stake for vol. Return to site on 8/19/10, stake not there, unable to calc flow

Sample Team Member Signature:

Page of

**Water Sampling Form ~~ HF-430**

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** E HLN Long-term Mont. **Site Designation:** Upstream Pond on R1D Proj.
**Project Code:** 10022 **Sample Code Number:** AEH-1007- 107
**Sample Team Member(s):** CBoyce **Sample Date:** 7-8-10
**Laboratory Used:** Energy Labs **Sample Time:** 13:30 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: AEH-1007-
Duplicate Sample Time:

***Site Conditions***

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: (calm) breeze windy
(no precip.) rain snow
(clear) p. cloudy overcast
Air Temperature: °C 27.5 °F

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia.²)/25 Comments
TD (ft)
SWL (ft) no access/pumping
Casing Diameter (I.D.") :
Water Volume (V) (gal)
x 3=(gal.)
Actual Vol. Removed (gal.)
Pumping Rate (gpm)

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | PUMP ON | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) clear (slight) moderate very

**Sample Method:** (describe) (grab) composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | 17.84* | |
| pH | 7.75 | |
| SC (µmhos/cm) | 549 | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | 18.44 | |
| Color | Tan | |
| Odor | | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 500 ml | Unfiltered | Raw | common | |
| 1 | 250 ml | Unfiltered | $HNO_3$ | TRC Metals | |
| 1 | 250 ml | Filtered | HCL | Diss Al | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments: DO is unstable ranging from 16.1 - 20.8.

Sample Team Member Signature: Page of

**Water Sampling Form ~~ HF-430**

**Hydrometrics, Inc.**
Consulting Scientists and Engineers

**Project Name:** E. HLW Long-term Mont. **Site Designation:** Downstream Pond on R-D
**Project Code:** 10022 **Sample Code Number:** AEH-1007- 105
**Sample Team Member(s):** C Bryan **Sample Date:** 7-8-10
**Laboratory Used:** Energy Labs **Sample Time:** 13:55 (military)

***If Duplicate Sample Collected, Please Record Below***

Duplicate Sample Code #: AEH-1007-
Duplicate Sample Time:

***Site Conditions***

New Site: Yes (No) Photo taken: Yes (No)
Site Type: DRY (surface water) process water
monitoring well domestic well adit seep
spring– other:
Weather Conditions: (calm) breeze windy
(no precip.) rain snow
(clear) p. cloudy overcast
Air Temperature: °C @ 75 °F

***For Groundwater Samples***

well volume formula: V = (TD-SWL)x(Dia²) / 25 Comments
TD (ft)
SWL (ft) no access/pumping
Casing Diameter (I.D.")
Water Volume (V) (gal)
x 3=(gal.)
Actual Vol. Removed (gal.)
Pumping Rate (gpm)

***For Surface Water Samples***

Flow Method: Marsh McBirney Volumetric Flume Weir Estimate
Other Flow or Description:
Flow: gpm cfs Staff Gage:

***Field Parameter Stabilization***

| Time (military) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/l) | pH | S.C. (µmhos/cm) | Turbidity (n.t.u.) | Temperature (°C) | Additional Parameters or Notes |
|---|---|---|---|---|---|---|---|
| | PUMP ON | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**Turbidity:** (circle) (clear) slight moderate very

**Sample Method:** (describe) (grab) composite pump bailer other

***Field Parameters***

| | Sample | Duplicate |
|---|---|---|
| ORP (mV) | | |
| DO (mg/l) | 16.60 | |
| pH | 7.66 | |
| SC (µmhos/cm) | 543 | |
| Turbidity (ntu) | | |
| $H_2O$ Tmp. (°C) | 19.04 | |
| Color | None | |
| Odor | None | |

***Bottles Collected***

| Quantity | Size | Filter or Unfilt. | Preservative | Parameter | Additional Notes |
|---|---|---|---|---|---|
| 1 | 500 ml | Unfiltered | Raw | common | |
| 1 | 250 ml | Unfiltered | $HNO_3$ | TRC Metals | |
| 1 | 250 ml | Filtered | HCL | Diss Al | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |
| | ml | F or UF | | | |

Comments:

Sample Team Member Signature: Page of

APPENDIX 10-C(3)

# Stormwater Photo Log

PHOTO 1: CULVERT UNDER OLD HOPTOE BINS
SAMPLE # EHSW-1005-100

PHOTO 2: ASPHALT DRAINING SAMPLE MILL AND HIGH GRADE SOIL AREA
SAMPLE # EHSW-1005-101

PHOTO 3: DISCHARGE FROM BAGHOUSE LINER
SAMPLE # EHSW-1005-102

PHOTO 4: DISCHARGE FROM BAGHOUSE SUMP
SAMPLE # EHSW-1005-103

PHOTO 5: WATER REPORTING TO SCALE HOUSE SUMP
SAMPLE # EHSW-1005-104

PHOTO 6: PONDED WATER ON NORTH SIDE OF SCALE HOUSE (NO DISCHARGE FROM HERE)
SAMPLE # EHSW-1005-105

PHOTO 7: SINTER PLANT SUMP
SAMPLE # EHSW-1005-106

PHOTO 8: DISCHARGE FROM SINTER PLANT LINER
SAMPLE # EHSW-1005-107

PHOTO 9: NORTHERN MOST SUMP FROM DRAINGE OFF EAST SIDE OF CSHB
SAMPLE # EHSW-1005-109

PHOTO 10: RUNOFF FROM RR TRACK SOIL ON WEST SIDE OF THAWHOUSE
SAMPLE # EHSW-1005-110 (SAMPLE # EHSW-1005-111 TAKEN DIRECTLY FROM SUMP AT BOTTOM OF CONCRETE RAMP SHOWN IN PICTURE.)

PHOTO 11: ORE STORAGE YARD CONCRETE RUNOFF
SAMPLE # EHSW-1005-112

PHOTO 12: ORE STORAGE YARD SOIL RUNOFF
SAMPLE # EHSW-1005-113

PHOTO 13: ORE STORAGE YARD COMBINATION OF SAMPLE 112 AN 113
SAMPLE # EHSW-1005-114

PHOTO 14: STORM WATER SUMP BY WTP
SAMPLE # EHSW-1005-115